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DuPont Fluoroproducts
22828 NC Highway 87 W
Fayetteville, NC 28306-7332

October 2, 2008

CERTIFIED REGISTERED MAIL

Mr. Steven F. Vozzo
NCDENR – Division of Air Quality
Fayetteville Regional Office
225 Green Street – Suite 714
Fayetteville, NC 28301-5094

Subject: Submittal of the Notification of Compliance Status Report
Miscellaneous Organic Chemical Manufacturing NESHAP ("MON")
Title V Permit No. 03735T33
Facility ID: 0900009

Dear Mr. Vozzo:

As specified by 40 CFR 63.9(h)(2)(i) and 63.2520(d), attached is the required notification of compliance status report for the Miscellaneous Organic Chemical Manufacturing NESHAP. This NESHAP is codified in 40 CFR Part 63 as Subpart FFFF.

If you should need any additional information, please contact Michael Johnson at 910-678-1155.

By my signature below, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

Karen B Wrigley

Karen B. Wrigley
Plant Manager

Attachment

cc: USEPA – Region 4; Air, Pesticides, and Toxic Management Division

DuPont Company – Fayetteville Works

Notification of Compliance Status Report

Miscellaneous Organic Chemical Manufacturing NESHAP

40 CFR 63 Subpart FFFF

Pursuant to 40 CFR 63.2520(d), this document is the DuPont Company – Fayetteville Works' notification of compliance status report for the Miscellaneous Organic Chemical Manufacturing NESHAP ("MON") codified in 40 CFR 63 Subpart FFFF. Each requirement specified in Part 63.2520(d) is addressed below.

The DuPont Company – Fayetteville Works has six miscellaneous chemical process units ("MCPU") that are subject to the MON, and they are:

- Butacite® MCPU-1: Polyvinyl Alcohol (PVA) Dissolver Process
- Butacite® MCPU-2: Polyvinyl Butyral (PVB) Process
- Nafion® MCPU-1: Hexafluoropropylene Oxide (HFPO) Process
- Nafion® MCPU-2: Vinyl Ethers North (VEN) Process
- Nafion® MCPU-3: Vinyl Ethers South (VES) Process
- Nafion® MCPU-4: Nafion® Polymers Process

Requirement 1

Part 63.2520(d)(1) states:

> *"You must submit the notification of compliance status report no later than 150 days after the applicable compliance date specified in §63.2445."*

The due date of the notification of compliance status report for the MON is October 7, 2008. By the submittal of this report prior to that date, this requirement is satisfied.

Requirement 2

Part 63.2520(d)(2)(i) states:

> *"The notification of compliance status report must include the results of any applicability determinations, emission calculations, or analyses used to identify and quantify HAP usage or HAP emissions from the affected source."*

The applicability determinations are shown as Attachment 1 and Attachment 2.

Requirement 3

Part 63.2520(d)(2)(ii) states:

> *"The notification of compliance status report must include the results of emissions profiles, performance tests, engineering analyses, design evaluations, flare compliance assessments, inspections and repairs, and calculations used to demonstrate initial compliance according to §§63.2455 through 63.2485. For performance tests, results must include descriptions of sampling and analysis procedures and quality assurance procedures."*

The results of engineering analyses and calculations used to demonstrate initial compliance are shown in Attachment 1 and Attachment 2.

Requirement 4

Part 63.2520(d)(2)(iii) states:

> *"The notification of compliance status report must include descriptions of monitoring devices, monitoring frequencies, and the operating limits established during the initial compliance demonstrations, including data and calculations to support the levels you establish."*

The DuPont Company – Fayetteville Works' sources that are subject to the MON do not require any monitoring devices, monitoring frequencies or operating limits. Therefore, this section is not applicable.

Requirement 5

Part 63.2520(d)(2)(iv) states:

> *"The notification of compliance status report must include all operating scenarios."*

The DuPont Company – Fayetteville Works' sources that are subject to the MON do not have any operating scenarios that require controls to comply with the MON requirements. Therefore, this section is not applicable.

Requirement 6

Part 63.2520(d)(2)(v) states:

> *"The notification of compliance status report must include descriptions of worst-case operating and/or testing conditions for control devices."*

The DuPont Company – Fayetteville Works' sources that are subject to the MON do not have any operating scenarios that require controls to comply with the MON requirements. Hence there are no control devices associated with the MON. Therefore, this section is not applicable.

Requirement 7

Part 63.2520(d)(2)(vi) states:

"The notification of compliance status report must include identification of parts of the affected source subject to overlapping requirements described in §63.2535 and the authority under which you will comply."

The DuPont Company – Fayetteville Works' Nafion® MCPU-1, MCPU-2, MCPU-3, and MCPU-4 do have equipment and emission streams that are subject to the provisions of both this subpart and 40 CFR parts 264 and 265, Subpart BB.

Pursuant to §63.2535, this facility elects to comply only with the provisions as specified in Part 63.2535(b)(2) for the monitoring of hazardous waste equipment leaks following the requirements of Parts 264 and 265, Subpart BB, in lieu of the MON requirements found in Part 63.2480.

Requirement 8

Part 63.2520(d)(2)(vii) states:

"The notification of compliance status report must include the information specified in §63.1039(a)(1) through (3) for each process subject to the work practice standards for equipment leaks in Table 6 to this subpart."

The DuPont Company – Fayetteville Works' Nafion® MCPU-1, MCPU-2, MCPU-3, and MCPU-4 are subject to the work practice standards for equipment leaks specified in Table 6 to Subpart FFFF of Part 63. The number of each equipment type excluding equipment in vacuum service is shown in the following table:

Type	Number	Light Liquid	Heavy Liquid	Vapor
Agitators	1	0	0	1
Pumps	16	16	0	0
Valves	598	598	0	0
Connectors	2164	2164	0	0
Pressure Relief Valves	15	0	0	15

The method of compliance is monthly leak detection and repair. Initial monitoring was started on April 17, 2008. Monitoring of pumps and valves are conducted at the frequencies specified in §63.1025(b)(3) and §63.1026(b)(1).

Requirement 9

Part 63.2520(d)(2)(viii) states:

> *"The notification of compliance status report must identify storage tanks for which you are complying with the vapor balancing alternative in §63.2470(e)."*

The DuPont Company – Fayetteville Works' sources that are subject to the MON do not have any storage tanks that require controls to comply with the MON requirements. Therefore, this section is not applicable.

Requirement 10

Part 63.2520(d)(2)(viii) states:

> *"The notification of compliance status report must identify records as specified in §63.2535(l)(1) through (3) of process units used to create a PUG and calculations of the initial primary product of the PUG."*

The DuPont Company – Fayetteville Works' MCPUs that are subject to the MON are not part of a Process Unit Group ("PUG"). Therefore, this section is not applicable.

Attachment 1

Miscellaneous Organic NESHAP Applicability Assessment

40 CFR 63, Subpart FFFF

DuPont Company - Fayetteville Works Butacite® Polyvinyl Butyral Process

Prepared by:

Paul R. Jann
Debbie J. Mulrooney

DuET Environmental Group
Wilmington, Delaware

Attachment 1

MON NESHAP Applicability Assessment

1. Butacite® Process Detailed Description

Subpart FFFF, Section 63.2550, defines a miscellaneous organic chemical manufacturing process ("MCPU") as:

Miscellaneous organic chemical manufacturing process means all equipment which collectively function to produce a product or isolated intermediate that are materials described in Sec. 63.2435(b). For the purposes of this subpart, process includes any, all or a combination of reaction, recovery, separation, purification, or other activity, operation, manufacture, or treatment which are used to produce a product or isolated intermediate. A process is also defined by the following: (1) Routine cleaning operations conducted as part of batch operations are considered part of the process; (2) Each nondedicated solvent recovery operation is considered a single process; (3) Each nondedicated formulation operation is considered a single process that is used to formulate numerous materials and/or products; (4) Quality assurance/quality control laboratories are not considered part of any process; and (5) Ancillary activities are not considered a process or part of any process. (6) The end of a process that produces a solid material is either up to and including the dryer or extruder, or for a polymer production process without a dryer or extruder, it is up to and including the extruder, die plate, or solid-state reactor, except in two cases. If the dryer, extruder, die plate, or solid-state reactor is followed by an operation that is designed and operated to remove HAP solvent or residual HAP monomer from the solid, then the solvent removal operation is the last step in the process. If the dried solid is diluted or mixed with a HAP-based solvent, then the solvent removal operation is the last step in the process.

Isolated intermediate means a product of a process that is stored before subsequent processing. An isolated intermediate is usually a product of a chemical synthesis, fermentation, or biological extraction process. Storage of an isolated intermediate marks the end of a process. Storage occurs at any time the intermediate is placed in equipment used solely for storage. The storage equipment is part of the MCPU that produces the isolated intermediate and is not assigned as specified in Sec. 63.2435(d).

Unit operation means those processing steps that occur within distinct equipment that are used, among other things, to prepare reactants, facilitate reactions, separate and purify products, and recycle materials. Equipment used for these purposes includes, but is not limited to, reactors, distillation columns, extraction columns, absorbers, decanters, dryers, condensers, and filtration equipment.

Based on the definitions above, the Butacite® Polyvinyl Butyral process consists of two batch MCPUs; the first, Butacite® MCPU-1, produces the isolated intermediate Polyvinyl Alcohol ("PVA") activated solution and the second, Butacite® MCPU-2, produces Polyvinyl Butyral ("PVB") polymer. The only hazardous air pollutant in this process is methanol, which is bound up in the solid PVA flake when brought onto the site via rail hopper cars. The PVA flake is pneumatically unloaded into one of two storage silos until needed.

The Butacite® MCPU-1 batch cycle consists of adding a weighed amount of PVA flake and water into the small Pre-Dissolver Tank in the correct ratio. The slurry is transferred to one of two Dissolver Tanks where the mix is heated with live steam in order to dissolve the PVA flake in the water, then small amounts of non-HAP organic activators are added, and finally the pH is adjusted. The mixture is heated and then transferred to a larger Hold-Up Tank, where it is stored as heated activated PVA solution for feeding the Butacite® MCPU-2 batch reactors. Both Dissolver Tanks and the Hold-Up Tank have reflux condensers on their vents.

Butacite® MCPU-2 has two process lines, "Line A" and "Line B", which are fed activated PVA intermediate from the Butacite® MCPU-1 Hold-Up Tank. Line A has four condensation kettle reactors (A, B, C, D), two wash kettles (A, B), a large Master Blend Tank C, and a flake dryer to produce PVB flake product for overseas consumption. Line B has three condensation kettle reactors (E, F, and G), two wash kettles (C and D), a large Master Blend Tank B, and an extruder to make polymer sheeting. The Butacite® MCPU-2 batch consists of filling a condensation kettle with raw materials and then reacting those raw materials to create PVB polymer dispersion. The PVB dispersion mix is then washed with water in the Wash Kettle and transferred to the Large Master Blend tank. Here the dispersion is coagulated into larger particles and either sent to the flake dryer when shipping PVB pellets overseas, or sent to an extruder to produce polymer sheeting. All seven condensation kettles have reflux condensers on them, which in turn vent to one of two water scrubbers. The flake dryer has a cyclone separator and a bag filter to capture polymer dust. An additional bag filter controls dust from loading the polymer flake into overseas containers.

2. Storage Tanks

Subpart FFFF, Section 63.2550 definitions:

<u>Storage tank</u> means a tank or other vessel that is used to store liquids that contain organic HAP and/or hydrogen halide and halogen HAP and that has been assigned to an MCPU according to the procedures in Sec. 63.2435(d). The following are not considered storage tanks for the purposes of this subpart: (1) Vessels permanently attached to motor vehicles such as trucks, railcars, barges, or ships; (2) Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere; (3) Vessels storing organic liquids that contain HAP only as impurities; (4) Wastewater storage tanks; (5) Bottoms receivers; (6) Surge control vessels; and (7) Process tanks.

Group 1 storage tank means a storage tank with a capacity greater than or equal to 10,000 gal storing material that has a maximum true vapor pressure of total HAP greater than or equal to 6.9 kilopascals (1.0 psia) at an existing source or greater than or equal to 0.69 kilopascals at a new source. Group 2 storage tank means a storage tank that does not meet the definition of a Group 1 storage tank.

There are no storage tanks associated with either Butacite® MCPU-1 or Butacite® MCPU-2. PVA silos 9050 and 7138 do not store organic liquid and are too small to meet the storage tank volume definition and are thus process vessels. These silos have a capacity of approximately 6300 gallons. Master Blend Tanks B and C are 40,000 gallon capacity but contain solid polymer flakes and water, which means they also are process vessels and not storage tanks. All other tanks in both MCPUs have a capacity less than 10,000 gallons and are therefore process vessels and are not subject to MON storage tank requirements.

3. Process Vents

Subpart FFFF, Section 63.2550 definitions:

Batch process vent means a vent from a unit operation or vents from multiple unit operations within a process that are manifolded together into a common header, through which a HAP-containing gas stream is, or has the potential to be, released to the atmosphere. Examples of batch process vents include, but are not limited to, vents on condensers used for product recovery, reactors, filters, centrifuges, and process tanks. The following are not batch process vents for the purposes of this subpart:

(1) Continuous process vents;
(2) Bottoms receivers;
(3) Surge control vessels;
(4) Gaseous streams routed to a fuel gas system(s);
(5) Vents on storage tanks, wastewater emission sources, or pieces of equipment subject to the emission limits and work practice standards in Tables 4, 6, and 7 to this subpart;
(6) Drums, pails, and totes;
(7) Flexible elephant trunk systems that draw ambient air (i.e., the system is not ducted, piped, or otherwise connected to the unit operations) away from operators when vessels are opened; and
(8) Emission streams from emission episodes that are undiluted and uncontrolled containing less than 50 ppmv HAP are not part of any batch process vent. A vent from a unit operation, or a vent from multiple unit operations that are manifolded together, from which total uncontrolled HAP emissions are less than 200 lb/yr is not a batch process vent; emissions for

all emission episodes associated with the unit operation(s) must be included in [[Page 354]] the determination of the total mass emitted. The HAP concentration or mass emission rate may be determined using any of the following: process knowledge that no HAP are present in the emission stream; an engineering assessment as discussed in Sec. 63.1257(d)(2)(ii), except that you do not need to demonstrate that the equations in Sec. 63.1257(d)(2)(i) do not apply, and the precompliance reporting requirements specified in Sec. 63.1257(d)(2)(ii)(E) do not apply for the purposes of this demonstration; equations specified in Sec. 63.1257(d)(2)(i), as applicable; test data using Method 18 of 40 CFR part 60, appendix A; or any other test method that has been validated according to the procedures in Method 301 of appendix A of this part.

Group 1 batch process vent means each of the batch process vents in a process for which the collective uncontrolled organic HAP emissions from all of the batch process vents are greater than or equal to 10,000 lb/yr at an existing source or greater than or equal to 3,000 lb/yr at a new source.

Group 2 batch process vent means each batch process vent that does not meet the definition of Group 1 batch process vent.

Continuous process vent means the point of discharge to the atmosphere (or the point of entry into a control device, if any) of a gas stream if the gas stream has the characteristics specified in Sec. 63.107(b) through (h), or meets the criteria specified in Sec. 63.107(i), except:

(1) The reference in Sec. 63.107(e) to a chemical manufacturing process unit that meets the criteria of Sec. 63.100(b) means an MCPU that meets the criteria of Sec. 63.2435(b);
(2) The reference in Sec. 63.107(h)(4) to Sec. 63.113 means Table 1 to this subpart;
(3) The references in Sec. 63.107(h)(7) to Sec. Sec. 63.119 and 63.126 mean Tables 4 and 5 to this subpart; and
(4) For the purposes of Sec. 63.2455, all references to the characteristics of a process vent (e.g., flowrate, total HAP concentration, or TRE index value) mean the characteristics of the gas stream.
(5) The reference to ``total organic HAP'' in Sec. 63.107(d) means ``total HAP'' for the purposes of this subpart FFFF.
(6) The references to an ``air oxidation reactor, distillation unit, or reactor'' in Sec. 63.107 mean any continuous operation for the purposes of this subpart.
(7) A separate determination is required for the emissions from each MCPU, even if emission streams from two or more MCPU are combined prior to discharge to the atmosphere or to a control device.

Attachment 1

All vents associated with Dissolver Butacite® MCPU-1 are classified as batch vents; there are no continuous process vents. The batch vents associated with Dissolver Butacite® MCPU-1 are:

- Silo 9050 vent (includes unloading PVA from railcar)
- Silo 7138 vent (includes unloading PVA from railcar)
- Pre-Dissolver Tank vent
- Dissolver Tank A reflux condenser vent
- Dissolver Tank B reflux condenser vent
- Hold-Up Tank reflux condenser vent

The calculations for uncontrolled HAP emissions from Butacite® MCPU-1 are attached in Appendix A. The overall sum of HAP emissions from this process is only 1918 lb/year. Therefore the batch process vents for Butacite® MCPU-1 are classified as Group 2 batch vents and do not require emission controls. The majority of vents associated with PVB Butacite® MCPU-2 are classified as batch vents, but several vents at the back end of the MCPU are continuous gas streams that do not meet the continuous process vent definition of $\geq$ 50 ppmw HAP.

The batch vents associated with PVB Polymer Butacite® MCPU-2 are:

- Reflux Condenser A vent
- Reflux Condenser B vent
- Reflux Condenser C vent
- Reflux Condenser D vent
- Reflux Condenser E vent
- Reflux Condenser F vent
- Reflux Condenser G vent
- Scrubber A vent
- Scrubber B vent
- Wash Kettle A vent
- Wash Kettle B vent
- Wash Kettle C vent
- Wash Kettle D vent

The four continuous gas stream vents that do not meet the continuous process vent definition due to their extremely low HAP concentration (< 10 ppmw) are:

- Large Master Blend Tank C
- Large Master Blend Tank B
- Flake Dryer vent
- Extruder vent

The calculations for uncontrolled HAP emissions from Butacite® MCPU-2 are also attached in Appendix A. The overall sum of HAP emissions from this process is only 2304 lb/year. Therefore the batch process vents for MCPU-2 are classified as Group 2 and do not require emission controls.

4. Transfer Operations

Subpart FFFF, Section 63.2550 definitions:

Transfer rack means the collection of loading arms and loading hoses, at a single loading rack, that are assigned to an MCPU according to the procedures specified in Sec. 63.2435(d) and are used to fill tank trucks and/or rail cars with organic liquids that contain one or more of the organic HAP listed in section 112(b) of the CAA of this subpart. Transfer rack includes the associated pumps, meters, shutoff valves, relief valves, and other piping and valves.

Group 1 transfer rack means a transfer rack that loads more than 0.65 million liters/year of liquids that contain organic HAP with a rack-weighted average partial pressure, as defined in Sec. 63.111, greater than or equal to 1.5 pound per square inch absolute.

There are no transfer racks or loading arms that load out organic liquids from either Butacite® MCPU-1 or Butacite® MCPU-2. Therefore the MON transfer rack requirements are not applicable to the Butacite® process area.

5. Wastewater

Subpart FFFF, Section 63.2550 definitions:

Wastewater means water that is discarded from an MCPU or control device through a POD and that contains either: an annual average concentration of compounds in Tables 8 and 9 to this subpart of at least 5 ppmw and has an annual average flowrate of 0.02 liters per minute or greater; or an annual average concentration of compounds in Tables 8 and 9 to this subpart of at least 10,000 ppmw at any flowrate. Wastewater means process wastewater or maintenance wastewater. The following are not considered wastewater for the purposes of this subpart: (1) Stormwater from segregated sewers; (2) Water from fire-fighting and deluge systems, including testing of such systems; (3) Spills; (4) Water from safety showers; (5) Samples of a size not greater than reasonably necessary for the method of analysis that is used; (6) Equipment leaks; (7) Wastewater drips from procedures such as disconnecting hoses after cleaning lines; and (8) Noncontact cooling water.

Attachment 1

A *Group 1 wastewater stream* is defined in §63.2485 as a process wastewater stream that meets any of the following:

(1) the total annual average concentration of compounds in Table 8 is ≥10,000 ppmw at any flowrate
(2) the total annual average concentration of compounds in Table 8 is ≥1,000 ppmv and the annual average flowrate is ≥1.0 liter/min
(3) the combined total annual average concentration of compounds in Tables 8 and 9 is ≥ 30,000 ppmw, and the combined total annual load of compounds in Tables 8 and 9 is ≥ 1 ton/yr

Methanol is the only HAP contained in wastewater streams from Butacite® MCPU-1 and Butacite® MCPU-2. It is a soluble HAP and listed in Table 9 of the MON.

Butacite® MCPU-1 does not generate any process wastewater. It does generate maintenance wastewater whenever a Dissolver Tank, pump or other process equipment is taken off-line for repair. Based on process knowledge, the methanol concentration in the PVA solution is 2500 ppmw. Therefore any wastewater generated during maintenance activity would dilute the methanol concentration to well below the "Group 1 like characteristics" (i.e. 30,000 ppmw soluble HAP). All maintenance wastewater generated is thus equivalent to a Group 2 wastewater stream and does not require any special handling to minimize HAP emissions per Part 63.105.

Butacite® MCPU-2 generates both process and maintenance wastewater streams. Two process wastewater streams are generated from Scrubbers A and B. The methanol concentration at the point of determination (POD) of both these scrubbers is between 8 ppmw and 20 ppmw, and therefore the streams are classified as Group 2. Wash Kettles A, B, C, and D also generate process wastewater streams. Based on process knowledge and historic data, the methanol concentration ranges between 730 ppw and 900 ppmw in the final PVB product slurry of the condensation reactors. The product slurry is transferred to the wash kettles where the PVB granules receive multiple washes with clean water before being discharged to sewer. Therefore the wash kettle wastewater streams from all four kettles have concentrations considerably less than the 900 ppmw in the product slurry and are therefore classified as Group 2. Butacite® MCPU-2 also generates maintenance wastewater from shutdown and repair activity but cannot be "Group 1 like in characteristics" due to methanol concentrations that are even lower than process wastewater concentrations. Therefore special handling of maintenance wastewater is not required per Part 63.105 to minimize HAP emissions.

6. Equipment leaks

Subpart FFFF, Section 63.2550 definitions:

In organic HAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP as determined according to the provisions of Sec. 63.180(d). The provisions of Sec. 63.180(d) also specify how to determine that a piece of equipment is not in organic HAP service.

Table 3 of the MON states that the equipment leak requirements apply to equipment that is "in organic HAP service."

There are no process streams in either Butacite® MCPU-1 or Butacite® MCPU-2 that contain HAP (methanol) concentrations at or above 5 wt % . Therefore, the MON LDAR monitoring requirements in Table 3 do not apply to the Butacite® process area.

7. Heat Exchange Systems

A *heat exchange system* is defined in §63.101 as any cooling tower system or once-through cooling water system (e.g., river or pool water). Table 10 of the MON states that heat exchange systems are required to be in compliance with the work practice standards in §63.104. According to §63.104(a)(6), the work practice standards in §63.104 are not required for a once-through heat exchange system which is used to cool process fluids that contain less than 5% by weight of HAP listed in Table 9 of subpart G.

The only use of cooling water in either Butacite® MCPU-1 or Butacite® MCPU-2 is for cooling process reflux condensers. Since the process fluids in both MCPUs have HAP concentrations less than 5 wt %, the heat exchange monitoring requirements per MON Table 10 do not apply.

8. Halogenated emissions

Subpart FFFF, Section 63.2550 definitions:

Halogen atoms mean chlorine and fluorine.

Halogenated vent stream means a vent stream determined to have a mass emission rate of halogen atoms contained in organic compounds of 0.45 kilograms per hour or greater determined by the procedures presented in Sec. 63.115(d)(2)(v).

Attachment 1

Hydrogen halide and halogen HAP means hydrogen chloride, hydrogen fluoride, and chlorine.

Since neither hydrogen halides nor halogen HAP compounds are used or emitted from either Butacite® MCPU-1 or Butacite® MCPU-2, the requirements in Table 3 do not apply to the Butacite® process area.

Attachment 1

Table 1

Butacite® MCPU-1: Polyvinyl Alcohol ("PVA") Dissolver Process
MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
PVA Silo 9050	Does not meet storage tank definition	Not Required	Contains solid polymer flake only
PVA Silo 9050 conservation vent	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
PVA Silo 7138	Does not meet storage tank definition	Not Required	Contains solid polymer flake only
PVA Silo 7138 conservation vent	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Pre-Dissolver Tank	Process vessel, Group 2 batch vent	Not Required	Contains polymer flake and water
Dissolver Tank A	Process tank	Not Required	<10,000 lb/yr HAP
Tank A Reflux Condenser	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Dissolver Tank B	Process tank	Not Required	<10,000 lb/yr HAP
Tank B Reflux Condenser	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Hold-Up Tank (PVA Intermediate)	Process tank	Not Required	<10,000 lb/yr HAP
Hold-Up Tank Reflux Condenser	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Wastewater from repair activity	Maintenance wastewater	N/A	<5 wt % HAP in process
Heat Exchange Systems	Uses once-through river water for cooling condensers	N/A	<5 wt % HAP in process
Hydrogen Halide/Halogen HAP Vents	N/A	N/A	No halogen atoms in process
Equipment Leak Components	Does not meet "in organic HAP service"	Not Required	<5% HAP concentration
Product Transfer Racks	Does not meet transfer rack definition	Not Required	Do not load-out organic liquids

Attachment 1

Table 2

Butacite® MCPU-2: Polyvinyl Butyral ("PVB") Process – Line 'A' System

MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Condensation Kettle A	Process tank	Not Required	<10,000 lb/yr HAP
Condensation Kettle B	Process tank	Not Required	<10,000 lb/yr HAP
Condensation Kettle C	Process tank	Not Required	<10,000 lb/yr HAP
Condensation Kettle D	Process tank	Not Required	<10,000 lb/yr HAP
Reflux Condenser A	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Reflux Condenser B	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Reflux Condenser C	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Reflux Condenser D	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Scrubber A Vent	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Scrubber A Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Wash Kettle A	Process tank, Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Wash Kettle A Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Wash Kettle B Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Master Blend Tank C	Process tank	Not Required	<10,000 lb/yr HAP
Master Blend Tank C vent	Does not meet continuous process vent definition	Not Required	<50 ppmw HAP
Flake Dryer vent / Cyclone Separator/Bag Filters	Does not meet continuous process vent definition	Not Required	<50 ppmw HAP

Attachment 1

Table 3

Butacite® MCPU-2: Polyvinyl Butyral ("PVB") Process – Line 'B' System

MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Condensation Kettle E	Process tank	Not Required	<10,000 lb/yr HAP
Condensation Kettle F	Process tank	Not Required	<10,000 lb/yr HAP
Condensation Kettle G	Process tank	Not Required	<10,000 lb/yr HAP
Reflux Condenser E	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Reflux Condenser F	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Reflux Condenser G	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Scrubber B vent	Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Scrubber B Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Wash Kettle C	Process tank, Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Wash Kettle C Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Wash Kettle D	Process tank, Group 2 batch vent	Not Required	<10,000 lb/yr HAP
Wash Kettle D Wastewater Stream	Group 2 wastewater stream	Not Required	<30,000 ppmw HAP
Master Blend Tank B	Process tank	Not Required	<10,000 lb/yr HAP
Master Blend Tank B vent	Does not meet continuous process vent definition	Not Required	<50 ppmw HAP
Extruder vent	Does not meet continuous process vent definition	Not Required	<50 ppmw HAP
Equipment Leak Components	Does not meet "in organic HAP service"	Not Required	<5% HAP concentration
Product Transfer Racks	Does not meet transfer rack definition	Not Required	Do not load-out organic liquids
Heat Exchange Systems	Uses once-through river water for cooling condensers	N/A	<5 wt % HAP in process
Wastewater from repair activity	Maintenance wastewater	N/A	N/A
Hydrogen Halide/Halogen HAP Vents	N/A	N/A	No halogen atoms in process

Appendix A

Uncontrolled Emissions Calculations: Butacite® MCPU-1 and Butacite® MCPU-2

The MON rule requires uncontrolled emission calculations for batch-type processes to be estimated using the equations in the National Emission Standards for Pharmaceuticals Production (40 CFR 63.1257). A commercial software called "Emission Master" incorporates these same equations into a user-friendly package and was used to calculate the emissions for the Fayetteville Work's two Butacite® processes that are subject to the MON. See below for emission summary totals for the two Butacite® MCPU uncontrolled emissions.

The only step in the Butacite® MCPU-1 process that was not amenable to using the regulatory equations was the unloading of PVA solid flake raw material into the silos. A very small amount of methanol solvent outgasses from the PVA solid flake material while being stored in the PVA silos. When a railcar is unloaded into the silo, the displaced silo air vents the methanol outgasses to the atmosphere. The methanol emissions from this process step were estimated from headspace air sample measurements to be 766 lb/yr based on the maximum production rate of 365 railcar unloadings per year.

Butacite® MCPU-1 PVA Dissolver Process

Butacite® MCPU-1 Process Steps	Methanol (lb/yr)
Silo Emissions from PVA transfer	766
Emissions from all batch process steps	1152
Total Methanol (HAP) Emissions	**1918**

Butacite® MCPU-2 Polyvinyl Butyral Process

Butacite® MCPU-2 Process Steps	Methanol (lb/yr)
Emissions from all batch process steps	2304
Total Methanol (HAP) Emissions	**2304**

Attachment 1 – Appendix A

Summary of Steps Modeled in Emission Master

Step	Description	Ingredients in Vessel Before Step: Water	Solid	MeOH	BA	NaOH	Total	Ingredients in Added: Water	Solid	MeOH	BA	NaOH
1	Add PVA and Water to Pre-Dissolver Tank	-	-	-	-	-		24,300	6,008	67	-	-
2	Transfer PVA Mixture to Dissolvers	24,300	6,008	67	-	-	30,375	-	-	-	-	-
3	Heat Contents of Dissolvers	24,300	6,008	67	-	-	30,375	-	-	-	-	-
4	Add Steam to Dissolvers	24,300	6,008	67	-	-	30,375	8,825	-	-	-	-
5	Transfer Dissolver Contents to Hold Up Tank	33,125	6,008	67	-	-	39,200	-	-	-	-	-
6	Transfer Hold Up Tank Contents to Condensation Kettles	33,125	6,008	67	-	-	39,200	-	-	-	-	-
7	Charge BA to Condenation Kettles (simultaneous with 6)	33,125	6,008	67	-	-	39,200	-	-	-	1,468	-
8	Hold for Reaction	33,125	6,008	67	1,468	-	40,668	-	-	-	-	-
9	Add Caustic and Steam	33,125	7,516	27	-	-	40,668	294	-	-	-	11
10	Nitrogen Sweep for 30 Minutes to Remove Residual BA	33,419	7,516	27	-	11	40,973	-	-	-	-	-
11	Add Caustic	33,419	7,516	27	-	11	40,973	34	-	-	-	8
12	Agitate for 20 Minutes	33,453	7,516	27	-	19	41,015	-	-	-	-	-
13	Transfer to Wash Kettles	33,453	7,516	27	-	19	41,015	-	-	-	-	-
14	Add 1000 Gallons of Wash Water	33,453	7,516	27	-	19	41,015	8,340	-	-	-	-

Step	Description	Temp (°C)	Time (min)	Notes
1	Add PVA and Water to Pre-Dissolver Tank	21	34	Methanol assumed to be 1% of solid weight
2	Transfer PVA Mixture to Dissolvers	21	34	
3	Heat Contents of Dissolvers	21-90	40	Other ingredients are not included,they do not include HAPs,very minute quantities
4	Add Steam to Dissolvers	100	40	Simultaneous with Step 3, must be modeled as a separate step in Emission Master
5	Transfer Dissolver Contents to Hold Up Tank	90	20	
6	Transfer Hold Up Tank Contents to Condensation Kettles	90	34	
7	Charge BA to Condensation Kettles	90	34	Simultaneous with Step 6, must be modeled as a separate step in Emission Master
8	Hold for Reaction	90	60	Assumed 900 ppm MeOH left after reaction
9	Add Caustic and Steam	90	2	
10	Nitrogen Sweep for 30 Minutes to Remove Residual BA	90	30	Nitrogen purge rate of 35 scfm
11	Add Caustic	90	2	
12	Agitate for 20 Minutes	90	20	
13	Transfer to Wash Kettles	60	10	
14	Add 1000 Gallons of Wash Water	33	15	

Attachment 1 – Appendix A

Summary of Emission Master Results

Emissions for Butacite® MCPU-1

To determine the worst case emissions, they are calculated on a continuous basis.

Step	Methanol Emission Rate (lb/hr)	(lb/yr)
1	1.19E-02	104
2	1.19E-02	104
3	2.47E-02	216
4	4.05E-02	355
5	4.25E-02	373
Total		1152

Emissions for Butacite® MCPU-2

HAP Emission rate per batch from Emission Master report Summary Page =	0.3464	lb
Amount of product in modeled batch =	7516	lb
Emission rate per pound of product =	4.6088E-05	lb methanol/lb product
Maximum product capacity =	50,000,000	lb/yr
Maximum pre-control HAP emissions =	2,304	lb/yr

Attachment 1 – Appendix A

Title Page

Product: Fayetteville Butacite
Process: MCPU 1
Process Cycle Time: 2.79 hr
Evaluation Date: 9/4/2008
File Name: M:\EMASTER\Emaster WILM\Butacite MCPU1.emm
Connected Database: Emaster WILM = M:\EMASTER\Emaster WILM\Emaster
Calculation type: MACT98
Condenser Calc. type: Single Stage
Charge Calc. type: Average Composition
Last Saved User: mulroodj
Last Saved Time: 3:13:37 PM, 9/8/2008
Comment:

Defined Activities

1) Add PVA and Water to Pre-Dissolver Tank
2) Transfer PVA Mixture to Dissolvers
3) Heat Contents of Dissolver
4) Add Steam to Dissolver
5) Transfer Dissolver Contents to Hold Up Tank

Attachment 1 – Appendix A

1: Filling Activity

Recipe Step: 1
Title: Add PVA and Water to Pre-Dissolver Tank
Process Segment: 1
Start Time: 0.0 hr
Elapsed Time: 0.56 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 0.0 gal Charged Volume: 3641.8445 gal Final Volume: 3641.8445 gal

Vessel Name: Fayetteville Pre-Dissolver Tank
Void Vol.: 400.0 gal Work Vol.: 400.0 gal
No Control Devices

Initial Contents -
Mixture Not Defined

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	98.9326	2.206e-003	1.266e-0031.0		0.12528
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	18.4667	0.8	0.8168	1.0	15.084

Final Contents 3641.8445 gal 30375.0 lb 21.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	98.9326	2.206e-003	1.266e-0031.0		0.12528
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	18.4667	0.8	0.8168	1.0	15.084

Emissions From Vessel: Fayetteville Pre-Dissolver Tank

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	744.7907	1.2341	35.7505	63.8401
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.12528	2.0758e-004	6.6508e-003	1.1876e-002
Solid	0.0	0.0	0.0	0.0
Water	15.084	2.4993e-002	0.45025	0.80403

Attachment 1 – Appendix A

2: Transfer Activity

Recipe Step: 2
Title: Transfer PVA Mixture to Dissolvers
Process Segment: 1
Start Time: 0.56 hr
Elapsed Time: 0.56 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 0.0 gal Charged Volume: 3641.8445 gal Final Volume: 3641.8445 gal
Transfer From: Fayetteville Pre-Dissolver Tank

Vessel Name: FVille Dissolver Tank
Void Vol.: 6175.0 gal Work Vol.: 6175.0 gal
No Control Devices

Initial Contents -

Mixture Not Defined

Inlet Stream -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	98.9326	2.206e-003	1.266e-003	1.0	0.12528
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	18.4667	0.8	0.8168	1.0	15.084

Final Contents 3641.8445 gal 30375.0 lb 21.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	98.9326	2.206e-003	1.266e-003	1.0	0.12528
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	18.4667	0.8	0.8168	1.0	15.084

Emissions From Vessel: FVille Dissolver Tank

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	744.7907	1.2341	35.7505	63.8401
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.12528	2.0758e-004	6.6508e-003	1.1876e-002
Solid	0.0	0.0	0.0	0.0
Water	15.084	2.4993e-002	0.45025	0.80403

Attachment 1 – Appendix A

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3: Heating Activity

Recipe Step: 3
Title: Heat Contents of Dissolver
Process Segment: 1
Start Time: 1.12 hr
Elapsed Time: 0.67 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh — Saturation: 100.0% — Pressure: 760.0 mmHg
Initial Temperature: 21.0 °C
Final Temperature: 90.0 °C

Vessel Name: FVille Dissolver Tank
Void Vol.: 6175.0 gal — Work Vol.: 6175.0 gal
Device #1: FVille Dissolver Condenser @ 30.0 °C

Final Contents	3641.8445 gal	30375.0 lb 90.0 °C				
	Weight	Pure-Vp	W[i]	X[i]	A[i]	X*Vp*A
[Liquid Phase]	(lb)	(mm Hg)				(mm Hg)
Methanol	67.0	1971.6261	2.206e-003	1.266e-0031.0		2.4967
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	525.9029	0.8	0.8168	1.0	429.5685

Emissions From Vessel: FVille Dissolver Tank

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	513.9249	0.55224	15.9983	23.878
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	1.4425	1.5501e-003	4.9664e-002	7.4126e-002
Solid	0.0	0.0	0.0	0.0
Water	244.6325	0.26287	4.7357	7.0682

Emissions From Control Condenser: FVille Dissolver Condenser @ 30.0 °C

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	727.8037	0.55224	15.9983	23.878
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.68084	5.166e-004	1.6552e-002	2.4704e-002
Solid	0.0	0.0	0.0	0.0
Water	31.5155	2.3913e-002	0.4308	0.64299

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4: Sub-Surface Filling Activity

Recipe Step: 4
Title: Add Steam to Dissolver
Process Segment: 1
Start Time: 1.79 hr
Elapsed Time: 0.67 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 3641.8445 gal Charged Volume: 1057.4688 gal Final Volume: 4699.3133 gal

Vessel Name: FVille Dissolver Tank
Void Vol.: 6175.0 gal Work Vol.: 6175.0 gal
Device #1: FVille Dissolver Condenser @ 30.0 °C

Initial Contents -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	2.206e-003	1.266e-003	1.0	2.4967
Solid	6008.0	0.0	0.1978	0.1819	1.0	0.0
Water	24300.0	525.9029	0.8	0.8168	1.0	429.5685

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Water	8825.0	759.943	1.0	1.0	1.0	759.943

Final Contents 4699.3133 gal 39200.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Emissions From Vessel: FVille Dissolver Tank

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	316.2733	0.12325	3.5706	5.3292

[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	2.1864	8.5205e-004	2.73e-002	4.0746e-002
Solid	0.0	0.0	0.0	0.0
Water	441.5402	0.17207	3.0998	4.6266

Attachment 1 – Appendix A

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Emissions From Control Condenser: FVille Dissolver Condenser @ 30.0 °C

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	727.7936	0.12325	3.5706	5.3292
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.6935	1.1744e-004	3.7629e-003	5.6162e-003
Solid	0.0	0.0	0.0	0.0
Water	31.5129	5.3367e-003	9.6142e-002	0.1435

Attachment 1 – Appendix A

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5: Transfer Activity

Recipe Step: 5
Title: Transfer Dissolver Contents to Hold Up Tank
Process Segment: 1
Start Time: 2.46 hr
Elapsed Time: 0.33 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 0.0 gal Charged Volume: 4699.3133 gal Final Volume: 4699.3133 gal
Transfer From: FVille Dissolver Tank

Vessel Name: Fayetteville Hold-Up Tank
Void Vol.: 7600.0 gal Work Vol.: 7600.0 gal
Device #1: FVille Dissolver Condenser @ 30.0 °C

Initial Contents -
Mixture Not Defined

Inlet Stream -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Final Contents 4699.3133 gal 39200.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Emissions From Vessel: Fayetteville Hold-Up Tank

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	306.4667	0.53074	15.3754	46.5921
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	1.9255	3.3346e-003	0.10684	0.32376
Solid	0.0	0.0	0.0	0.0
Water	451.6077	0.78209	14.0896	42.6957

Attachment 1 – Appendix A

Emissions From Control Condenser: FVille Dissolver Condenser @ 30.0 °C

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	727.8676	0.53074	15.3754	46.5921
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.60093	4.3817e-004	1.4039e-002	4.2543e-002
Solid	0.0	0.0	0.0	0.0
Water	31.5315	2.2992e-002	0.4142	1.2552

Attachment 1 – Appendix A

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Summary Page

Emissions for

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-038.1524 lb/hr		63.8401 lb/hr	106.4451 lb
Methanol	67-56-1	1.7081e-002 lb/hr	4.2543e-002 lb/hr	4.7655e-002 lb
Solid	-	0.0 lb/hr	0.0 lb/hr	0.0 lb
Water	7732-18-5	0.66009 lb/hr	1.2552 lb/hr	1.8417 lb

Total emissions for all vents:

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-038.1524 lb/hr		63.8401 lb/hr	106.4451 lb
Methanol	67-56-1	1.7081e-002 lb/hr	4.2543e-002 lb/hr	4.7655e-002 lb
Solid	-	0.0 lb/hr	0.0 lb/hr	0.0 lb
Water	7732-18-5	0.66009 lb/hr	1.2552 lb/hr	1.8417 lb

Attachment 1 – Appendix A

Title Page

Product: Fayetteville Butacite
Process: MCPU 2
Process Cycle Time: 2.873 hr
Evaluation Date: 9/4/2008
File Name: M:\EMASTER\Emaster WILM\Butacite Emissions MCPU2.emm
Connected Database: Emaster WILM = M:\EMASTER\Emaster WILM\Emaster
Calculation type: MACT98
Condenser Calc. type: Single Stage
Charge Calc. type: Average Composition
Last Saved User: mulroodj
Last Saved Time: 9:20:11 AM, 9/10/2008
Comment:

Defined Activities

1) Transfer Hold Up Tank to Condensation Kettles
2) Charge BA to Condensation Kettles (Simultaneous with Transfer)
3) Hold for Reaction
4) Add Caustic and Steam
5) Nitrogen Sweep for 30 Minutes to Remove Residual BA
6) Add Caustic
7) Agitate for 20 Minutes
8) Transfer to Wash Kettles
9) Add 1000 Gallons of Wash Water

Attachment 1 – Appendix A

Emission Master 7.4.2.2

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1: Filling Activity

Recipe Step: 6
Title: Transfer Hold Up Tank to Condensation Kettles
Process Segment: 1
Start Time: 0.0 hr
Elapsed Time: 0.56 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 0.0 gal Charged Volume: 4699.3133 gal Final Volume: 4699.3133 gal

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Initial Contents -

Mixture Not Defined

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Final Contents 4699.3133 gal 39200.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Emissions From Vessel: Fayettville Condensation Kettle

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	306.4667	0.53074	15.3754	27.4561
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	1.9255	3.3346e-003	0.10684	0.19079
Solid	0.0	0.0	0.0	0.0
Water	451.6077	0.78209	14.0896	25.16

Attachment 1 – Appendix A

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2: Sub-Surface Filling Activity

Recipe Step: 7
Title: Charge BA to Condensation Kettles (Simultaneous with Transfer)
Process Segment: 2
Start Time: 0.0 hr
Elapsed Time: 0.56 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh   Saturation: 100.0%   Pressure: 760.0 mmHg
Initial Volume: 4699.3133 gal Charged Volume: 219.2567 gal   Final Volume: 4918.57 gal

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal   Work Vol.: 13300.0 gal
No Control Devices

Initial Contents -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	67.0	1971.6261	1.709e-003	9.766e-004	1.0	1.9255
Solid	6008.0	0.0	0.1533	0.1403	1.0	0.0
Water	33125.0	525.9029	0.845	0.8587	1.0	451.6077

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Butyraldehyde	1468.0	88.56	1.0	1.0	1.0	88.56

Final Contents   4918.57 gal 40668.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Butyraldehyde	1468.0	215.77	3.61e-002	9.419e-003	1.0	2.0323
Methanol	67.0	1971.6261	1.647e-003	9.674e-004	1.0	1.9074
Solid	6008.0	0.0	0.1477	0.139	1.0	0.0
Water	33125.0	525.9029	0.8145	0.8506	1.0	447.3542

Emissions From Vessel: Fayettville Condensation Kettle

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	307.59	2.4853e-002	0.72	1.2857

[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Butyraldehyde	1.0193	8.2362e-005	5.9388e-003	1.0605e-002
Methanol	1.9164	1.5485e-004	4.9613e-003	8.8595e-003
Solid	0.0	0.0	0.0	0.0
Water	449.4743	3.6318e-002	0.65428	1.1683

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3: Holding Activity

Recipe Step: 8
Title: Hold for Reaction
Process Segment: 2
Start Time: 0.56 hr
Elapsed Time: 1.0 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Final Contents	4873.956 gal	40668.0 lb 90.0 °C				
[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.639e-004	3.804e-004	1.0	0.74999
Solid	7516.0	0.0	0.1848	0.1696	1.0	0.0
Water	33125.0	525.9029	0.8145	0.83	1.0	436.4917

Emissions From Vessel: Fayettville Condensation Kettle

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	322.7583	0.0	0.0	0.0
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.74999	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	436.4917	0.0	0.0	0.0

Attachment 1 – Appendix A

4: Filling Activity

Recipe Step: 9
Title: Add Caustic and Steam
Process Segment: 2
Start Time: 1.56 hr
Elapsed Time: 3.3e-002 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 4873.956 gal Charged Volume: 35.8478 gal Final Volume: 4909.8038 gal

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Initial Contents -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.639e-004	3.804e-004	1.0	0.74999
Solid	7516.0	0.0	0.1848	0.1696	1.0	0.0
Water	33125.0	525.9029	0.8145	0.83	1.0	436.4917

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Sodium Hydroxide	11.0	0.0	3.607e-002	1.657e-002	1.0	0.0
Water	294.0	525.9029	0.9639	0.9834	1.0	517.1877

Final Contents 4909.8038 gal 40973.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.59e-004	3.776e-004	1.0	0.74441
Sodium Hydroxide	11.0	0.0	2.685e-004	1.232e-004	1.0	0.0
Solid	7516.0	0.0	0.1834	0.1684	1.0	0.0
Water	33419.0	525.9029	0.8156	0.8311	1.0	437.0917

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Emissions From Vessel: Fayettville Condensation Kettle

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	242.0651	3.1978e-003	9.2641e-002	2.8073
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.74719	9.8708e-006	3.1626e-004	9.5837e-003
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	517.1877	6.8324e-003	0.12309	3.7299

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5: Purging Activity

Recipe Step: 10
Title: Nitrogen Sweep for 30 Minutes to Remove Residual BA
Process Segment: 2
Start Time: 1.593 hr
Elapsed Time: 0.5 hr
Vent ID:
Noncondensable: Nitrogen @ 2100.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Final Contents	4909.8038 gal	40973.0 lb 90.0 °C				
	Weight	Pure-Vp	W[i]	X[i]	A[i]	X*Vp*A
[Liquid Phase]	(lb)	(mm Hg)				(mm Hg)
Methanol	27.0	1971.6261	6.59e-004	3.776e-004	1.0	0.74441
Sodium Hydroxide	11.0	0.0	2.685e-004	1.232e-004	1.0	0.0
Solid	7516.0	0.0	0.1834	0.1684	1.0	0.0
Water	33419.0	525.9029	0.8156	0.8311	1.0	437.0917

Emissions From Vessel: Fayettville Condensation Kettle

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Nitrogen	322.1639	2.9247	81.9305	163.861
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.74441	6.7579e-003	0.21652	0.43305
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	437.0917	3.968	71.4855	142.9709

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6: Filling Activity

Recipe Step: 11
Title: Add Caustic
Process Segment: 2
Start Time: 2.093 hr
Elapsed Time: 3.0e-002 hr
Vent ID:
Noncondensable: Nitrogen @ 2.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 4909.8038 gal Charged Volume: 4.5242 gal Final Volume: 4914.3279 gal

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Initial Contents -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.59e-004	3.776e-0041.0		0.74441
Sodium Hydroxide	11.0	0.0	2.685e-004	1.232e-0041.0		0.0
Solid	7516.0	0.0	0.1834	0.1684	1.0	0.0
Water	33419.0	525.9029	0.8156	0.8311	1.0	437.0917

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Sodium Hydroxide	8.0	0.0	0.1905	9.582e-0021.0		0.0
Water	34.0	17.3515	0.8095	0.9042	1.0	15.6889

Final Contents 4914.3279 gal 41015.0 lb 90.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.583e-004	3.772e-0041.0		0.74371
Sodium Hydroxide	19.0	0.0	4.632e-004	2.126e-0041.0		0.0
Solid	7516.0	0.0	0.1833	0.1682	1.0	0.0
Water	33453.0	525.9029	0.8156	0.8312	1.0	437.1275

Attachment 1 – Appendix A

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Emissions From Vessel: Fayettville Condensation Kettle

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Nitrogen	322.1463	7.0422e-004	1.9728e-002	0.65759
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.74406	1.6265e-006	5.2114e-005	1.7371e-003
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	437.1096	9.5553e-004	1.7214e-002	0.57381

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7: Holding Activity

Recipe Step: 12
Title: Agitate for 20 Minutes
Process Segment: 2
Start Time: 2.123 hr
Elapsed Time: 0.33 hr
Vent ID:
Noncondensable: Nitrogen @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg

Vessel Name: Fayettville Condensation Kettle
Void Vol.: 13300.0 gal Work Vol.: 13300.0 gal
No Control Devices

Final Contents	4914.3279 gal	41015.0 lb 90.0 °C				
[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	1971.6261	6.583e-004	3.772e-004	1.0	0.74371
Sodium Hydroxide	19.0	0.0	4.632e-004	2.126e-004	1.0	0.0
Solid	7516.0	0.0	0.1833	0.1682	1.0	0.0
Water	33453.0	525.9029	0.8156	0.8312	1.0	437.1275

Emissions From Vessel: Fayettville Condensation Kettle

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Nitrogen	322.1287	0.0	0.0	0.0
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.74371	0.0	0.0	0.0
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	437.1275	0.0	0.0	0.0

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8: Transfer Activity

Recipe Step: 13
Title: Transfer to Wash Kettles
Process Segment: 2
Start Time: 2.453 hr
Elapsed Time: 0.17 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 0.0 gal Charged Volume: 4914.3279 gal Final Volume: 4914.3279 gal
Transfer From: Fayettville Condensation Kettle

Vessel Name: Fayetteville Wash Kettle
Void Vol.: 6000.0 gal Work Vol.: 6000.0 gal
No Control Devices

Initial Contents -
Mixture Not Defined

Inlet Stream -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	626.4427	6.583e-004	3.772e-0041.0		0.2363
Sodium Hydroxide	19.0	0.0	4.632e-004	2.126e-0041.0		0.0
Solid	7516.0	0.0	0.1833	0.1682	1.0	0.0
Water	33453.0	149.4297	0.8156	0.8312	1.0	124.2052

Final Contents 4914.3279 gal 41015.0 lb 60.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	626.4427	6.583e-004	3.772e-0041.0		0.2363
Sodium Hydroxide	19.0	0.0	4.632e-004	2.126e-0041.0		0.0
Solid	7516.0	0.0	0.1833	0.1682	1.0	0.0
Water	33453.0	149.4297	0.8156	0.8312	1.0	124.2052

Emissions From Vessel: Fayetteville Wash Kettle

[Non Condensables]	Effective Vp (mm Hg)	Moles (lb-mole)	Weight (lb)	Rate (lb/hr)
Air	635.5585	1.2547	36.3475	213.8089

[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.2363	4.6648e-004	1.4946e-002	8.7918e-002
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	124.2052	0.24519	4.4173	25.9839

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9: Filling Activity

Recipe Step: 14
Title: Add 1000 Gallons of Wash Water
Process Segment: 2
Start Time: 2.623 hr
Elapsed Time: 0.25 hr
Vent ID:
Noncondensable: Air @ 0.0 scfh Saturation: 100.0% Pressure: 760.0 mmHg
Initial Volume: 4914.3279 gal Charged Volume: 999.3529 gal Final Volume: 5913.6808 gal

Vessel Name: Fayetteville Wash Kettle
Void Vol.: 6000.0 gal Work Vol.: 6000.0 gal
No Control Devices

Initial Contents -

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	626.4427	6.583e-004	3.772e-004	1.0	0.2363
Sodium Hydroxide	19.0	0.0	4.632e-004	2.126e-004	1.0	0.0
Solid	7516.0	0.0	0.1833	0.1682	1.0	0.0
Water	33453.0	149.4297	0.8156	0.8312	1.0	124.2052

Inlet Stream -
Mixture Name: Stream #1

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Water	8340.0	17.3515	1.0	1.0	1.0	17.3515

Final Contents 5913.6808 gal 49355.0 lb 60.0 °C

[Liquid Phase]	Weight (lb)	Pure-Vp (mm Hg)	W[i]	X[i]	A[i]	X*Vp*A (mm Hg)
Methanol	27.0	626.4427	5.471e-004	3.125e-004	1.0	0.19574
Sodium Hydroxide	19.0	0.0	3.85e-004	1.761e-004	1.0	0.0
Solid	7516.0	0.0	0.1523	0.1393	1.0	0.0
Water	41793.0	149.4297	0.8468	0.8602	1.0	128.535

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Emissions From Vessel: Fayetteville Wash Kettle

	Effective Vp	Moles	Weight	Rate
[Non Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Air	633.2794	0.25423	7.3649	29.4598
[Condensables]	(mm Hg)	(lb-mole)	(lb)	(lb/hr)
Methanol	0.21475	8.6209e-005	2.7621e-003	1.1049e-002
Sodium Hydroxide	0.0	0.0	0.0	0.0
Solid	0.0	0.0	0.0	0.0
Water	126.5058	5.0785e-002	0.91491	3.6596

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Summary Page

Emissions for

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-0	20.8495 lb/hr	213.8089 lb/hr	59.9005 lb
Butyraldehyde	123-72-8	2.0671e-003 lb/hr	1.0605e-002 lb/hr	5.9388e-003 lb
Methanol	67-56-1	0.12057 lb/hr	0.43305 lb/hr	0.3464 lb
Nitrogen	7727-37-9	28.5243 lb/hr	163.861 lb/hr	81.9502 lb
Sodium Hydroxide	1310-73-2	0.0 lb/hr	0.0 lb/hr	0.0 lb
Solid	-	0.0 lb/hr	0.0 lb/hr	0.0 lb
Water	7732-18-5	31.9185 lb/hr	142.9709 lb/hr	91.7018 lb

Total emissions for all vents:

	CAS	Avg. Rate	Max. Rate	Total Weight
Air	132259-10-0	20.8495 lb/hr	213.8089 lb/hr	59.9005 lb
Butyraldehyde	123-72-8	2.0671e-003 lb/hr	1.0605e-002 lb/hr	5.9388e-003 lb
Methanol	67-56-1	0.12057 lb/hr	0.43305 lb/hr	0.3464 lb
Nitrogen	7727-37-9	28.5243 lb/hr	163.861 lb/hr	81.9502 lb
Sodium Hydroxide	1310-73-2	0.0 lb/hr	0.0 lb/hr	0.0 lb
Solid	-	0.0 lb/hr	0.0 lb/hr	0.0 lb
Water	7732-18-5	31.9185 lb/hr	142.9709 lb/hr	91.7018 lb

Attachment 2

Miscellaneous Organic NESHAP Applicability Assessment

40 CFR 63, Subpart FFFF

DuPont Company - Fayetteville Works Nafion® Fluorochemical Processes

Prepared by:

Dianne L. Fields

DuPont Company – Fayetteville Works
Fayetteville, North Carolina

Attachment 2

MON NESHAP Applicability Assessment

1. Nafion® Process Detailed Description

Subpart FFFF, Section 63.2550, defines a miscellaneous organic chemical manufacturing process ("MCPU") as:

Miscellaneous organic chemical manufacturing process means all equipment which collectively function to produce a product or isolated intermediate that are materials described in Sec. 63.2435(b). For the purposes of this subpart, process includes any, all or a combination of reaction, recovery, separation, purification, or other activity, operation, manufacture, or treatment which are used to produce a product or isolated intermediate. A process is also defined by the following: (1) Routine cleaning operations conducted as part of batch operations are considered part of the process; (2) Each nondedicated solvent recovery operation is considered a single process; (3) Each nondedicated formulation operation is considered a single process that is used to formulate numerous materials and/or products; (4) Quality assurance/quality control laboratories are not considered part of any process; and (5) Ancillary activities are not considered a process or part of any process. (6) The end of a process that produces a solid material is either up to and including the dryer or extruder, or for a polymer production process without a dryer or extruder, it is up to and including the extruder, die plate, or solid-state reactor, except in two cases. If the dryer, extruder, die plate, or solid-state reactor is followed by an operation that is designed and operated to remove HAP solvent or residual HAP monomer from the solid, then the solvent removal operation is the last step in the process. If the dried solid is diluted or mixed with a HAP-based solvent, then the solvent removal operation is the last step in the process.

Isolated intermediate means a product of a process that is stored before subsequent processing. An isolated intermediate is usually a product of a chemical synthesis, fermentation, or biological extraction process. Storage of an isolated intermediate marks the end of a process. Storage occurs at any time the intermediate is placed in equipment used solely for storage. The storage equipment is part of the MCPU that produces the isolated intermediate and is not assigned as specified in Sec. 63.2435(d).

Unit operation means those processing steps that occur within distinct equipment that are used, among other things, to prepare reactants, facilitate reactions, separate and purify products, and recycle materials. Equipment used for these purposes includes, but is not limited to, reactors, distillation columns, extraction columns, absorbers, decanters, dryers, condensers, and filtration equipment.

Based on the definitions above, the Nafion® process consists of four MCPUs; the first, Nafion® MCPU-1, produces hexafluoropropylene oxide ("HFPO"), the second, Nafion® MCPU-2, produces isolated intermediates Dimer and Diadduct, the third,

Attachment 2

Nafion® MCPU-3, produces isolated fluoromonomer intermediates, and the fourth, Nafion® MCPU-4 produces a copolymer.

<u>Nafion® MCPU-1</u>: The HFPO process produces hexafluoropropylene oxide ("HFPO") and uses two hazardous air pollutants ("HAP"): benzene and toluene.

Benzene is stored in the Benzene Feed Tank and is fed continuously to the Oxidation Distillation Column #1. The boiling point of benzene is high relative to other components in the column and, therefore, exits this column as a liquid with the tails stream. The benzene flows from the Oxidation Column #1 to the Solvent Recycle Tank. The benzene is then pumped with the solvent through the Solvent Recycle Cooler and Reactor Feed Heater before being destroyed in the reactor.

Toluene is stored in the Toluene Recycle Tank. The toluene is fed continuously to the Refining Column #1. Any toluene fed to this column exits as a liquid with the column tails stream. The toluene then flows through the Refining Column #2 Feed Cooler and into the Refining Column #2. Toluene fed to the Refining Column #2 exits with the column tails stream as a liquid and flows through the Refining Column #2 Tails Cooler before reentering the Toluene Recycle Tank.

Toluene is fed periodically to the Oxidation Column #3. Any toluene fed to this column exits with the column tails as a liquid before flowing into Crude Tank #1 or Crude Tank #2. Any material held-up in either of the Crude Tanks is ultimately fed to the Refining Column #1 (see above).

Toluene is also stored in the Product Loading Toluene Storage Tank. From this tank, toluene can be distributed to product shipping containers.

<u>Nafion® MCPU-2</u>: The Vinyl Ethers North process produces isolated intermediates Dimer and Diadduct. The Dimer and Diadduct are acid fluorides produced in separate campaigns and in the same equipment using similar processes. In both processes, an acid fluoride is produced and purified in a continuous process. The HAP used in the Dimer process is acetonitrile, which is used as a solvent for the reaction and for making the catalyst solution. The HAP used in Diadduct production is diglyme, a glycol ether, which is used as a solvent for the reaction and for making the catalyst solution.

The acetontrile or diglyme, hereafter referred to as "solvent", is introduced into the process from containers into the Solvent Tank. The Solvent Tank is used to store and feed solvent to the Catalyst Makeup Tank and to the Reactor. In the catalyst tank, active catalyst is added to the solvent, mixed, and then fed to the Reactor as needed. The Reactor provides the controlled environment for producing the acid fluorides. In the reactor's solvent phase, raw materials react in the presence of the catalyst to form acid fluorides. During the reaction, small amounts of other higher boiling acid fluoride by-products are also produced. The two phases in the reactor (solvent and acid fluorides) are continually mixed.

A portion of the reaction mixture is separated in two decanters. The lighter solvent phase is recycled back to the reactor. Any excess solvent that accumulates in the system over time is periodically purged to the Waste Hydrocarbon ISO container. This excess solvent stream contains no water and therefore is not a wastewater and hence is not subject to the MON, but instead is regulated under Part 265 Subpart BB. The heavier acid fluoride phase is fed to the Stripper Column. A small amount of solvent is carried downstream with the acid fluoride, but the bulk is removed by the decanters.

The Stripper Column is used to separate low boiling impurities and unreacted raw materials from the desired acid fluoride and higher boiling by-products. The low boiling impurities and unreacted raw materials are recycled to the reactor. The Stripper Overhead Receiver is used to collect these during the Diadduct campaign before recycling back to the reactor. The higher boiling components are fed from the Stripper Column to the Acid Fluoride ("AF") Column.

The AF Column is used to separate the desired acid fluoride Dimer or Diadduct from other impurities not removed by the Stripper Column. The AF Overhead Receiver collects the overhead stream from the column and feeds it to the AF Overhead Decanter, which is used to separate the acid fluoride from any residual solvent that remains. The heavier acid fluoride phase is returned to the process. The lighter solvent phase, which is purged periodically to the Waste Hydrocarbon ISO container, contains no water and therefore is not a wastewater and hence is not subject to the MON, but instead is regulated under Part 265 Subpart BB.

The purified acid fluoride, Dimer or Diadduct, is collected in a storage tank where it is isolated and stored prior to transfer to a downstream batch process.

<u>Nafion® MCPU-3</u>: The Vinyl Ethers South process produces isolated intermediates PMPF and PEPF. The PMPF and PEPF are acid fluorides coproduced in the same equipment. In this process, the acid fluorides are produced and purified in a continuous process. The HAP in this process is acetonitrile, which is used as a solvent for the reaction and for making the catalyst solution.

The acetontrile is introduced into the process from containers into the Solvent Tank. The Solvent Tank is used to store and feed solvent to the Catalyst Tank and to the Reactor. In the Catalyst Tank, active catalyst is added to the solvent, mixed, and then fed to the Reactor as needed. The Reactor provides the controlled environment for producing the acid fluorides. In the reactor's solvent phase, raw materials react in the presence of the catalyst to form acid fluorides. During the reaction, small amounts of other higher boiling acid fluoride by-products are also produced. The two phases in the reactor (solvent and acid fluorides) are continually mixed.

A portion of the reaction mixture is separated by a decanter. The lighter solvent phase is recycled back to the reactor. Any excess solvent that accumulates in the system over time is periodically purged to the Waste Hydrocarbon ISO container. This excess solvent stream contains no water and therefore is not a wastewater and hence is not subject to the MON, but instead is regulated under Part 265 Subpart BB. The heavier acid fluoride phase is fed to the Stripper Column. A small amount of solvent is carried downstream with the acid fluoride, but the bulk is removed by the decanter.

The Stripper Column is used to separate low boiling impurities and unreacted raw materials from the desired acid fluoride and higher boiling by-products. The low boiling impurities and unreacted raw materials are recycled to the reactor. The higher boiling components are fed from the Stripper Column to the Acid Fluoride ("AF") Column.

The AF Column is used to separate the desired acid fluorides PMPF and PEPF from other impurities not removed by the Stripper Column. The AF Overhead Receiver collects the overhead stream from the column and feeds it to the AF Overhead Decanter, which is used to separate the acid fluoride from any residual solvent that remains. The lighter solvent phase, which is purged periodically to the Waste Hydrocarbon ISO container, contains no water and therefore is not a wastewater and hence is not subject to the MON, but instead is regulated under Part 265 Subpart BB.

The purified acid fluoride phase is isolated and stored in the AF Overhead Receiver and Decanter prior to transfer to a downstream batch process.

Nafion® MCPU-4: Nafion® Polymers Process is a continuous polymerization process, producing a copolymer. Two fluoromonomers react to form the copolymer. The reactor effluent (slurry) then goes through several separation and purification steps to isolate the solid polymer and reclaim and purify unreacted monomers and the solvent solution for recycle back into the reactor. The only HAP in this process is methanol which is used in trace (parts per million) amounts to control polymer properties, and is used in larger quantities (1% - 2% by weight) to terminate the polymerization chain and stop the reaction. Methanol is entrained in the gas phase of the first separation process, and in a subsequent scrubbing step is removed to the site's wastewater treatment plant. Some methanol is also carried over in the liquid phase with the recycled solution. It is removed with molecular sieves in a subsequent purification step.

Attachment 2

2. Storage Tanks

Subpart FFFF, Section 63.2550 definitions:

Storage tank means a tank or other vessel that is used to store liquids that contain organic HAP and/or hydrogen halide and halogen HAP and that has been assigned to an MCPU according to the procedures in Sec. 63.2435(d). The following are not considered storage tanks for the purposes of this subpart: (1) Vessels permanently attached to motor vehicles such as trucks, railcars, barges, or ships; (2) Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere; (3) Vessels storing organic liquids that contain HAP only as impurities; (4) Wastewater storage tanks; (5) Bottoms receivers; (6) Surge control vessels; and (7) Process tanks.

Group 1 storage tank means a storage tank with a capacity greater than or equal to 10,000 gal storing material that has a maximum true vapor pressure of total HAP greater than or equal to 6.9 kilopascals (1.0 psia) at an existing source or greater than or equal to 0.69 kilopascals at a new source. Group 2 storage tank means a storage tank that does not meet the definition of a Group 1 storage tank.

There are no Group 1 storage tanks associated with any of the Nafion® MCPUs. Each tank in all four MCPUs has a capacity less than 10,000 gallons and is therefore not subject to MON storage tank requirements in Table 4 of Subpart FFFF, Section 63.2550.

3. Process Vents

Subpart FFFF, Section 63.2550 definitions:

Batch process vent means a vent from a unit operation or vents from multiple unit operations within a process that are manifolded together into a common header, through which a HAP-containing gas stream is, or has the potential to be, released to the atmosphere. Examples of batch process vents include, but are not limited to, vents on condensers used for product recovery, reactors, filters, centrifuges, and process tanks. The following are not batch process vents for the purposes of this subpart:

(1) Continuous process vents;
(2) Bottoms receivers;
(3) Surge control vessels;
(4) Gaseous streams routed to a fuel gas system(s);
(5) Vents on storage tanks, wastewater emission sources, or pieces of equipment subject to the emission limits and work practice standards in Tables 4, 6, and 7 to this subpart;
(6) Drums, pails, and totes;

(7) Flexible elephant trunk systems that draw ambient air (i.e., the system is not ducted, piped, or otherwise connected to the unit operations) away from operators when vessels are opened; and

(8) Emission streams from emission episodes that are undiluted and uncontrolled containing less than 50 ppmv HAP are not part of any batch process vent. A vent from a unit operation, or a vent from multiple unit operations that are manifolded together, from which total uncontrolled HAP emissions are less than 200 lb/yr is not a batch process vent; emissions for all emission episodes associated with the unit operation(s) must be included in [[Page 354]] the determination of the total mass emitted. The HAP concentration or mass emission rate may be determined using any of the following: process knowledge that no HAP are present in the emission stream; an engineering assessment as discussed in Sec. 63.1257(d)(2)(ii), except that you do not need to demonstrate that the equations in Sec. 63.1257(d)(2)(i) do not apply, and the precompliance reporting requirements specified in Sec. 63.1257(d)(2)(ii)(E) do not apply for the purposes of this demonstration; equations specified in Sec. 63.1257(d)(2)(i), as applicable; test data using Method 18 of 40 CFR part 60, appendix A; or any other test method that has been validated according to the procedures in Method 301 of appendix A of this part.

Group 1 batch process vent means each of the batch process vents in a process for which the collective uncontrolled organic HAP emissions from all of the batch process vents are greater than or equal to 10,000 lb/yr at an existing source or greater than or equal to 3,000 lb/yr at a new source.

Group 2 batch process vent means each batch process vent that does not meet the definition of Group 1 batch process vent.

Continuous process vent means the point of discharge to the atmosphere (or the point of entry into a control device, if any) of a gas stream if the gas stream has the characteristics specified in Sec. 63.107(b) through (h), or meets the criteria specified in Sec. 63.107(i), except:

(1) The reference in Sec. 63.107(e) to a chemical manufacturing process unit that meets the criteria of Sec. 63.100(b) means an MCPU that meets the criteria of Sec. 63.2435(b);

(2) The reference in Sec. 63.107(h)(4) to Sec. 63.113 means Table 1 to this subpart;

(3) The references in Sec. 63.107(h)(7) to Sec. Sec. 63.119 and 63.126 mean Tables 4 and 5 to this subpart; and

(4) For the purposes of Sec. 63.2455, all references to the characteristics of a process vent (e.g., flowrate, total HAP concentration, or TRE index value) mean the characteristics of the gas stream.

(5) The reference to ``total organic HAP'' in Sec. 63.107(d) means ``total HAP'' for the purposes of this subpart FFFF.

(6) The references to an ``air oxidation reactor, distillation unit, or reactor'' in Sec. 63.107 mean any continuous operation for the purposes of this subpart.
(7) A separate determination is required for the emissions from each MCPU, even if emission streams from two or more MCPU are combined prior to discharge to the atmosphere or to a control device.

All vents associated with the Nafion® MCPUs are classified as continuous process vents and are exempt from the Continuous Process requirements because either the vent contains less than 0.005wt% total HAP, or the flowrate is less than 0.005 scmm and the TRE is greater than 1.9. See Tables 1, 2, 3, and 4 in this attachment and Appendix A for calculations.

4. Transfer Operations

Subpart FFFF, Section 63.2550 definitions:

<u>*Transfer rack*</u> means the collection of loading arms and loading hoses, at a single loading rack, that are assigned to an MCPU according to the procedures specified in Sec. 63.2435(d) and are used to fill tank trucks and/or rail cars with organic liquids that contain one or more of the organic HAP listed in section 112(b) of the CAA of this subpart. Transfer rack includes the associated pumps, meters, shutoff valves, relief valves, and other piping and valves.

<u>*Group 1 transfer rack*</u> means a transfer rack that loads more than 0.65 million liters/year of liquids that contain organic HAP with a rack-weighted average partial pressure, as defined in Sec. 63.111, greater than or equal to 1.5 pound per square inch absolute.

There are no transfer racks or loading arms that load out organic liquids in any of the Nafion® MCPUs. Therefore the MON transfer rack requirements are not applicable to the Nafion® process area.

5. Wastewater

Subpart FFFF, Section 63.2550 definitions:

<u>*Wastewater*</u> means water that is discarded from an MCPU or control device through a POD and that contains either: an annual average concentration of compounds in Tables 8 and 9 to this subpart of at least 5 ppmw and has an annual average flowrate of 0.02 liters per minute or greater; or an annual average concentration of compounds in Tables 8 and 9 to this subpart of at least 10,000 ppmw at any flowrate. Wastewater means process wastewater or maintenance wastewater. The following are not considered wastewater for the purposes of this subpart: (1) Stormwater from segregated sewers; (2) Water from fire-fighting and deluge

systems, including testing of such systems; (3) Spills; (4) Water from safety showers; (5) Samples of a size not greater than reasonably necessary for the method of analysis that is used; (6) Equipment leaks; (7) Wastewater drips from procedures such as disconnecting hoses after cleaning lines; and (8) Noncontact cooling water.

A *Group 1 wastewater stream* is defined in §63.2485 as a process wastewater stream that meets any of the following:

(1) the total annual average concentration of compounds in Table 8 is ≥10,000 ppmw at any flowrate
(2) the total annual average concentration of compounds in Table 8 is ≥1,000 ppmv and the annual average flowrate is ≥1.0 liter/min
(3) the combined total annual average concentration of compounds in Tables 8 and 9 is ≥ 30,000 ppmw, and the combined total annual load of compounds in Tables 8 and 9 is ≥ 1 ton/yr

Methanol is the only HAP contained in wastewater streams from Nafion® MCPU-4. It is a soluble HAP and listed in Table 9 of the MON. Nafion® MCPU-4 generates both process and maintenance wastewater streams. The methanol concentration at the point of determination is 4,300 ppmw, and therefore the stream is classified as a Group 2 wastewater stream. Nafion® MCPU-4 also generates maintenance wastewater from shutdown and repair activity but cannot be "Group 1 like in characteristics" due to methanol concentrations that are even lower than process wastewater concentrations. Therefore special handling of maintenance wastewater is not required per 63.105 to minimize HAP emissions.

6. Equipment leaks

Subpart FFFF, Section 63.2550 definitions:

In organic HAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP as determined according to the provisions of Sec. 63.180(d). The provisions of Sec. 63.180(d) also specify how to determine that a piece of equipment is not in organic HAP service.

Table 3 of the MON states that the equipment leak requirements apply to equipment that is "in organic HAP service."

There are process streams in all four of the Nafion® MCPUs that are subject to the MON LDAR requirements in Table 6 of Part 63.2550. See Requirement 8 in this Notification of Compliance Status Report for the listing of the equipment types.

7. Heat Exchange Systems

A *heat exchange system* is defined in §63.101 as any cooling tower system or once-through cooling water system (e.g., river or pool water). Table 10 of the MON states that heat exchange systems are required to be in compliance with the work practice standards in §63.104. According to §63.104(a)(6), the work practice standards in §63.104 are not required for a once-through heat exchange system which is used to cool process fluids that contain less than 5% by weight of HAP listed in Table 9 of subpart G.

The only use of cooling water is in Nafion® MCPU-1 and Table 1 in this attachment lists the heat exchangers that must meet the requirements of Part 63.104.

8. Halogenated emissions

Subpart FFFF, Section 63.2550 definitions:

Halogen atoms mean chlorine and fluorine.

Halogenated vent stream means a vent stream determined to have a mass emission rate of halogen atoms contained in organic compounds of 0.45 kilograms per hour or greater determined by the procedures presented in Sec. 63.115(d)(2)(v).

Hydrogen halide and halogen HAP means hydrogen chloride, hydrogen fluoride, and chlorine.

Since neither hydrogen halides nor halogen HAP compounds are used or emitted from the Nafion® processes, the requirements in Table 3 of Part 63.2550 do not apply to the Nafion® process area.

Attachment 2

Table 1

Nafion® MCPU-1: Hexafluoropropylene Oxide (HFPO) Process

MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Benzene Feed Tank	Storage Tank – Group 2	Not Required	< 10,000 gal
Oxidation Column #1	Process Vessel	N/A	N/A (no vents)
Solvent Recycle Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
Solvent Recycle Cooler	Heat Exchange System	Not Required	Closed-loop cooling
Reactor Feed Heater	Process Vessel	N/A	N/A (no vents)
Reactor	Process Vessel	N/A	N/A (no vents)
Toluene Recycle Tank	Storage Tank – Group 2	Not Required	< 10,000 gal
Toluene Feed Cooler	Heat Exchange System	Not Required	Closed-loop cooling
Refining Column #1	Process Vessel	N/A	N/A (no vents)
Refining Column #1 Calandria	Process Vessel	N/A	N/A (no vents)
Refining Column #2 Feed Cooler	Heat Exchange System	Monitoring Once-Through Water	> 5% HAP
Refining Column #2	Process Vessel	N/A	N/A (no vents)
Refining Column #2 Calandria	Process Vessel	N/A	N/A (no vents)
Refining Column #2 Tails Cooler	Heat Exchange System	Monitoring Once-through Water	> 5% HAP
Oxidation Column #3	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
Crude Tank 1	Storage Tank – Group 2	Not Required	< 10,000 gal
Crude Tank 2	Storage Tank – Group 2	Not Required	< 10,000 gal
Product Loading Toluene Storage Tank	Storage Tank – Group 2	Not Required	< 10,000 gal

[1] Process modeling and mass balance

[2] Lab Analysis

[3] Calculation Appendix A

Attachment 2

Table 2

Nafion® MCPU-2: Vinyl Ethers North (VEN) Process

MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Solvent Tank	Storage Tank – Group 2	Not Required	< 10,000 gal
Catalyst Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[3] <0.005scmm
Reactor	Process Vessel	N/A	N/A (no vents)
Reactor Vent Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[2]< 0.005 wt%
Reactor Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
Reactor Decanter	Process Vessel	N/A	N/A (no vents) – HAP sent to RCRA container
Stripper Feed Decanter Inlet Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
Stripper Feed Decanter	Process Vessel	N/A	N/A (no vents) – HAP sent to RCRA container
Stripper Column	Process Vessel	N/A	N/A (no vents)
Lower Stripper Condenser	Process Vessel	N/A	N/A (no vents)
Upper Stripper Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
Stripper Overhead Receiver (SOR)	Process Vessel	N/A	N/A (no vents)
SOR Feed Pump Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
SOR Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
AF Column	Process Vessel	N/A	N/A (no vents)
Lower AF Column Condenser	Heat Exchange System	Not Required	1%[1] < 5% HAP
Upper AF Column Condenser	Heat Exchange System	Not Required	1%[1] < 5% HAP
AF Overhead Receiver	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
AF Decanter Inlet Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
AF Overhead Decanter	Process Vessel	N/A	N/A (no vents) – HAP sent to RCRA container
ABR Feed Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%

[1] Process modeling and mass balance [2] Lab Analysis [3] Calculation Appendix A

Attachment 2

Table 3

Nafion® MCPU-3: Vinyl Ethers South (VES) Process

MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Solvent Tank	Storage Tank – Group 2	Not Required	< 10,000 gal
Catalyst Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[3]<0.005scmm
Reactor	Process Vessel	N/A	N/A (no vents)
Reactor Vent Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
Reactor Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
Reactor Decanter Inlet Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
Reactor Decanter	Process Vessel	N/A	N/A (no vents) – HAP sent to RCRA container
Process to Process Heat Exchanger	Process Vessel	N/A	N/A (no vents)
Stripper Column	Process Vessel	N/A	N/A (no vents)
Stripper Column Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
AF Column	Process Vessel	N/A	N/A (no vents)
AF Column Condenser	Process Vessel	N/A	N/A (no vents)
AF Overhead Receiver	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
AF Overhead Cooler	Heat Exchange System	Not Required	Closed-loop cooling – no water
AF Overhead Decanter	Process Vessel	N/A	N/A (no vents) – HAP sent to RCRA container

[1] Process modeling and mass balance

[2] Lab Analysis

[3] Calculation Appendix A

Attachment 2

Table 4
Nafion® MCPU-4: Nafion® Polymers Process
MON Applicability Assessment Summary

Equipment or Emission Point	Classification	Control Device	Basis
Methanol Tote	Storage Tank – Group 2	Not Required	< 10,000 gal
Feed Tank	Storage Tank – Group 2	Not Required	< 10,000 gal
Polymerizer	Process Vessel	N/A	N/A (no vents)
Separator	Process Vessel	N/A	N/A (no vents)
Methanol Scrubber	Process Vessel	N/A	N/A (no vents)
Methanol Scrubber Effluent	Wastewater – Group 2	Not Required	4,300[1] ppmw < 30,000 ppmw
Filmtruder	Process Vessel	N/A	N/A (no vents)
Recirculation Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	TRE > 350[3]> 1.9
Decanter #1	Process Vessel	N/A	
Decanter #1 Effluent	Wastewater – Group 2	Not Required	6,000[1] ppmw < 30,000 ppmw
Decanter #2	Process Vessel	N/A	N/A (no vents)
Sieve Beds	Process Vessel	N/A	N/A (no vents)
Recycle Tank	Process Vessel	N/A	N/A (no vents)
Recycle Tank Condenser	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]< 0.005 wt%
Recovery Tank	Process Vessel – Group 2 Continuous Process Vent	Not Required	0[1]<0.005 wt%

[1] Process modeling and mass balance

[2] Lab Analysis

[3] Calculation Appendix A

Appendix A

Calculation of Average Flowrate for MCPU-2 and MCPU-3 vent flow rate of Catalyst Tank vent

MCPU-3 VES Catalyst Tank Vent: Average flow rate is << 5 L/min (0.005 scmm)

The typical batch makeup requires transfer of 60 kg of Acetonitrile into the tank, or about 67 L. Assume this is the amount of nitrogen displaced and vented when the transfer is made.

Frequency of the batch makeup depends on the catalyst feed rate. The pump maximum rate is 5 kg/h rate (typical feed half that), which calculates to 2 batch makeups per day.

2 batch/day * 67 L/batch = 134 L/day = 0.093 L/min << 5 L/min (0.005 scmm)

MCPU- 2 VEN - Dimer and Diadduct Processes: Average flow rate is << 5 L/min (0.005 scmm)

Catalyst is not added continuously. Not unusual to go over a week without making up a new batch. Batch size is similar to VE-S. Therefore the vent rate will be much smaller on average than for VE-S.

TRE Calculations for Nafion® MCPU-4: Nafion® Polymers Process Recirculation Tank

This spreadsheet calculates the Total Resource Effectiveness Index Value for the purpose of determining whether a process vent stream must satisfy. MACT for SOCMI Processes. **REVISED 9/19/95**

Definitions:

Group I Vent: TRE < 1.0

Group 2 Vent: TRE > 1.0

TRE 1.0 equivalent to $5000/Mg for Existing Source
TRE 1.0 equivalent to $11000/Mg for New Source

TRE = (1/Ehap)(a + b(Qs) + c(Ht) + d(Etoc))

Qs = Vent stream flow rate (standard cubic meters per minute) at 20°C.

Attachment 2 – Appendix A

Ehap = K2*(SUM OF (Cj)(Mj))*Qs where

Ehap = kg/hr of total organic HAPs
K2 = 2.494E-06
Cj = ppmv organic compound j on dry basis as measured by EPA Method 18
Mj = Molecular weight of compound j (g/g-mole)

Etoc = K2*(SUM OF (Cj)(Mj))*Qs where

Etoc = kg/hr Total Organic Compounds (minus methane and ethane)
K2 = 2.494E-06
Cj = ppmv organic compound j on dry basis as measured by EPA Method 18
Mj = Molecular weight of compound j (g/g-mole)

Ht = K1*(SUM OF (Cj)(Hj))*(1-Bws) where

Ht = Net heating value of sample, MJ/Nm3
K1 = 1.740E-07
Bws = Water Vapor Content by volume (ie, mole fraction)
Cj = ppmv organic compound j on dry basis as measured by EPA Method 18
Hj = Net heat of combustion of compound j, kcal/g-mole at 25°C and 1 atm

INPUT:

Organic Compound	Molecular Weight	TOC Concentration (ppmv dry)	HAP Concentration (ppmv dry)	Heat of Combustion (kcal/gmole)
Nitrogen	28	0	0	0
MeOH	32	865,448	12,300	0.169

Water Vapor Mole Fraction = 0.03 (typically 0.02-0.04 for 80-90°F at 50-70% r.h.)

Gas Volumetric Flow Rate (Nm3/min at 20°C): 0.151 scfm
0.004 Nm3/min (calculated)

OUTPUT:

Ht =	0.0246859
Etoc =	0.2953325
Ehap (kg/hr) =	0.0041974
Ehap (lb/hr) =	0.0092536

TRE VALUES FOR EXISTING VENT STREAMS:

Flare:	461.28
Thermal Incinerator:	355.63
Recup. Incinerator:	603.60
Thermal Scrubber*:	951.90

* Applicable to Halogenated Streams Only (ie, >100 ppmv halogens)

Attachment 2 – Appendix A

TRE VALUES FOR NEW VENT STREAMS:

Flare:	125.77
Thermal Inc:	96.96
Recup. Inc:	164.57
Thermal Scrubber*:	259.60

* Applicable to Halogenated Streams Only (ie, >100 ppmv halogens)